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## URBAN AGGLOMERATIONS IN THE REGIONAL DEVELOPMENT: THEORETICAL, METHODOLOGICAL AND APPLIED ASPECTS<sup>1</sup>

*The article focuses on the analysis of the major process of modern socio-economic development, such as the functioning of urban agglomerations. A short background of the economic literature on this phenomenon is given. There are the traditional (the concentration of urban types of activities, the grouping of urban settlements by the intensive production and labour communications) and modern (cluster theories, theories of network society) conceptions. Two methodological principles of studying the agglomeration are emphasized: the principle of the unity of the spatial concentration of economic activity and the principle of compact living of the population. The positive and negative effects of agglomeration in the economic and social spheres are studied. Therefore, it is concluded that the agglomeration is helpful in the case when it brings the agglomerative economy (the positive benefits from it exceed the additional costs). A methodology for examination the urban agglomeration and its role in the regional development is offered. The approbation of this methodology on the example of Chelyabinsk and Chelyabinsk region has allowed to carry out the comparative analysis of the regional centre and the whole region by the main socio-economic indexes under static and dynamic conditions, to draw the conclusions on a position of the city and the region based on such socio-economic indexes as an average monthly nominal accrued wage, the cost of fixed assets, the investments into fixed capital, new housing supply, a retail turnover, the volume of self-produced shipped goods, the works and services performed in the region. In the study, the analysis of a launching site of the Chelyabinsk agglomeration is carried out. It has revealed the following main characteristics of the core of the agglomeration in Chelyabinsk (structure feature, population, level of centralization of the core) as well as the Chelyabinsk agglomeration in general (coefficient of agglomeration, index of agglomeration, coefficient of the development of the population, growth rates of agglomeration). The analysis of the internal environment of the agglomeration has shown that the industry of the majority of the cities-satellites is unprofitable, the space of the urban agglomeration is very heterogeneous. The research proves that the creation of the agglomeration will allow to solve the problems of the production diversification at the territory, to perform the effective land use, to optimize transport and housing-and-municipal infrastructure.*

**Keywords:** urban agglomeration, spatial concentration of the population and economic activity, agglomerative economy, core and satellites of agglomeration, main characteristics of urban agglomeration, structural feature of agglomeration, population, level of centralization of the core of agglomeration, coefficient of agglomeration, index of agglomeration, coefficient of the development of the population of agglomeration, growth rates of agglomeration

### Problem Statement

The phenomenon of agglomeration has become a reality of the contemporary global and national development. The Russian Census of 2010 has shown that the share of the urban population comprised 73,7 % [1], out of which 45 % reside in urban agglomerations producing the major part of the Russian Federation GDP [2]. According to the Academician A. I. Tatarkin, it is no coincidence that “the largest cities are the leaders of investment, innovative, social processes and points of economic growth; and national economic growth rates in many respects depend on their development strategy” [3].

The interpretation of a term of “agglomeration” in the economic literature is far from unambiguous. It was introduced in the economy by Adna Ferrin Weber (USA). In her work “The Growth of Cities in the Nineteenth Century” (1899), she considered economic (structural) forces, including technological progress, appearance and development of trade, a territorial division of labor, etc., to be the prime cause of urban concentration of the population [4]. She offered statistical methods for the measurement of agglomerations and studied their influence on the national economic development.

Later, the agglomeration was studied in three directions: the migration of population, agglomeration effects and the location of industrial production.

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In the beginning of the XIXth century, French geographer M. Rouge considered the notion of agglomeration from the perspective of population migration and believed that the agglomeration appeared when the concentration of urban activities went beyond the limits of administrative borders and spread to neighboring settlements [2].

In 1909, American economist Alfred Weber in his work “On the Industrial Location: The Pure Theory of Standards” outlined three basic orientations in the industrial location: transport, labor and agglomeration. He believed that the function of agglomeration attracted small businesses with large-scale production. A. Weber outlined three factors on which the agglomeration depended: production weight, transport rate and standard weight [5, p. 50–51]. Thus, in the beginning of the XXth century, the above term was used to define the territorial accumulations of industrial enterprises.

In the end of the XIXth century, English economist A. Marshall was the first to justify a set of agglomeration effects from the concentration of economic activities manifested in the benefits from the availability of developed infrastructure, vast sales market, cutting of transport costs due to the proximity of contractors [6]. A significant contribution to the development of the agglomeration effects theory was made by American scientists K. Arrow and P. Romer, whereby it is accepted to call the effects connected with clusterization MAR-effects of clusterization (by the first letters of scientists Marshall, Arrow, Romer). In the modern conditions, it is necessary to divide agglomeration effects into 2 types: effects and urbanization effects (called Jacob’s effects by the name of American researcher Jane Jacobs, who focused thereon). [7].

In 1970–1990, there appeared a line in the economic development called urbanization economic theory or urban economic theory by Western economists [8–10]. Among the variety of research lines, the special attention was paid to agglomeration processes, which were considered in the following aspects:

- effect of localization and concentration of hi-tech companies within innovatively developed territories [11–13];
- effect of the industrial scale occurred due to the growth of population and urbanization [14];
- sectoral growth models at the level of large cities [15];
- regularities of the industrial agglomeration connected with economic integration [16];
- change of transport costs [17].

Currently, the interest of many foreign authors to the development of the largest cities being places of the concentration of basic resources of the fifth technological wave has expectedly grown. Among such theories, M. Castells’ network society theory [18] and M. Porter’s cluster theories are of a special interest.

In the national literature, the category of “agglomeration” became widespread in the 70s of the XXth century in the works of such scientists as G. M. Lappo [20], V. G. Davidovich, G. V. Gutman [21], etc.

In the modern conditions, some authors (A. A. Neschadin, G. L. Tulchinsky, etc.) believe that there is a change of paradigms in the generation of strategies of the spatial development of Russia, when it is necessary to consider two interconnected and supplementing processes: development of the agglomeration and innovative industrial clusters. In this regard, the agglomeration (concentration of population in large cities) develops in parallel with the foundation of clusters—a dense network of complementary economic entities united by their participation in the value creation chain and localized on a certain territory [22, p. 34].

Other authors (V. V. Gaevsky, etc.) propose to consider agglomerations in terms of:

- geography—as a dense concentration of a group of towns and other conglomerations united by production, social, labor and cultural and social links, infrastructural facilities, the common use of inter-settlement territories and resources;
- management—as a structure of management formed on the basis of a voluntary decision of neighboring municipal formations for the efficient management of joint development and the implementation of inter-municipal projects [23, p. 14].

Besides, there are economic research considering the stable economic development of large cities and regions in terms of the methodological principle of equilibrium between the municipal (regional) flow of products and income [24].

A considerable contribution to the development of the agglomeration theory was made by the Ural scientists, who studied the largest agglomerations of the Ural macro-region: Ekaterinburg (Sverdlovsk), Chelyabinsk, Perm and Ufa [25, 26].

The works of A. P. Burian, V. Glazychev, I. Starodubrovskaya, etc. focusing on its potential development, as well as labor, cultural and social links are devoted to the problems and prospects of Chelyabinsk urban agglomeration formation [27, 28].

In the modern conditions, during significant fluctuations in the environment, the importance of the development of the agglomeration layer on the Russian Federation territory is preconditioned, firstly, by the need for competitive recovery (including the solution of the imports phase-out problems), development and renewal of the national economy on the background of challenges formed by the external macro-environment [29]; secondly, by the expediency to study factors strengthening urbanization processes in the regional development [30]; thirdly, by the needs to solve geopolitical tasks by the formation of geopolitical influence centers, which allows to keep a large territory by a small number of population, as well as to form an “agglomeration layer” along the border of the Russian Federation [31].

In these conditions, one of the efficient forms of land use is the agglomeration forming a common socio-economic space with a common system of social, transport and engineering services and a natural and environmental frame [32].

### **Urban Agglomeration Phenomenon**

Agglomeration (from Lat. *agglomerare* – to incorporate, to accumulate) is a compact location, a grouping of urban settlements united by intensive production, labor, cultural, social and recreation links [33, p. 11].

An agglomeration has a nucleus—center of the urban agglomeration, and satellites—a group of settlements, which are spatially close and bound to the agglomeration center in the course of formation. The socio-economic potential of the largest nucleus inevitably feeds the nearest villages. In turn, satellites provide the center with various resources strengthening its potential.

As it is clear, the geographic definition of agglomeration prevails at such approach. In terms of economics, agglomeration processes are characterized not only by the connection of suburban and neighboring towns to the nucleus city but also by the formation of a common production-transport, energy, engineering-communication infrastructure located on a common territory.

The subject to the Russian methodologies, an urban agglomeration is a group of settlements, in which the population of the largest nucleus city comprises > 100 ths. people and at least two towns or urban-type settlements are located within a 1,5 hour distance therefrom [34].

The agglomeration phenomenon is explained: firstly, by characteristics of the territorial migration of the population preconditioned by natural-economic, historical-economic conditions, the ethnic characteristics of the population; secondly, by specificity of the formed network in the course of the dispersal of settlements united by spatial, economic and social links.

Characteristic features of an urban agglomeration:

- close economic links on cooperation and combination of industrial and agricultural enterprises;
- interconnected settlement, which leads to recurrent daily and weekly labor migrations between the cities;
- recurrent cultural and social, recreational, administrative-political and organizational and economic links;

Thus, at studying of the agglomeration, it is methodologically expedient to consider it as a unity of spatial concentration of economic activities and compact habitation of the population. The said feature leads to positive and negative effects in the economic and social urban spheres.

The following positive effects of the agglomeration can be listed in the economic sphere:

- a large market of goods and services, both private and public, is formed;
- production and social infrastructure is developing (urban traffic, health, education, communal services system, etc.);
- economic benefits are realized due to the growing output of local natural monopolies;
- scientific and technical resources are concentrated and innovations are actively implemented, etc. [35].

Favorable effects of the urban agglomeration in the social sphere:

- extended attraction of qualified employees in the public sector, which stimulates the scientific and technical progress;
- provision of a high level of leisure, diversified cultural activities;
- quicker knowledge transfer, as a result of which a city turns into a “machine of contrasts” and the generation of social and economic innovations.

Alongside with that, the agglomeration has negative effects:

- in the economic sphere: a) complication of transport links, remoteness of communication facilities; b) environmental contamination; c) worsening of the housing stock use; d) increase of the distance to the sources of heat, energy and water supply and treatment facilities, which results in growing of the average cost of a unit of such facilities; e) strengthening of irregularity in distribution of the tax base along the territory of the agglomeration and, consequently, increase of the gap in income between the center and the periphery, etc. [35];

- in the social sphere: a) increase of the transport fatigue connected with extension of the push-pull migration; b) increase of the distance to social infrastructural facilities; c) remoteness of the place of residence from forests, parks and water bodies; d) appearance of critical and declassed regions and growth of crime [35].

Thus, the agglomeration is expedient, provided that it brings agglomeration economies: positive benefits from formation thereof exceed additional costs connected with occurrence thereof.

### Research Procedure

Currently, there are several procedures for the evaluation of the urban agglomeration development level. They generally reflect integral indices based on private indicators. Most famous of them are:

1. Procedure of the Institute of Geography of the Russian Academy of Sciences (RAS), taking into account the following indices:

- number of population (must be  $\geq 250$  ths. inhabitants);
- agglomeration development coefficient (must be  $\geq 1$ );
- transport accessibility of the agglomeration nucleus [36].

2. The procedure of the Central Scientific Research and Design Institute for Town Development supplements the procedure of the Institute of Geography of RAS with such indices as two-hour transport accessibility of the nucleus, agglomerativeness coefficient and agglomerativeness index [37].

3. Procedure for the evaluation of the overall potential of a certain agglomeration offered by A.A. Ugryumova [38].

In our opinion, a complex evaluation of the urban agglomeration must contain the socio-economic indices of agglomeration development, apart from territorial and demographic indices. Therefore, in our procedure, indices are united in three groups: 1) indices characterizing the agglomeration's position in regional development; 2) indices characterizing agglomeration development in general; 3) indices characterizing the internal development of the agglomeration.

Thus, the procedure for studying the urban agglomeration and its role in regional development assumes the following analysis algorithm.

The first stage is comparative characteristics of the regional center and region in statics and dynamics by the key socio-economic development indices:

- average monthly nominal accrued wage;
- agricultural products;
- new housing supply;
- retail turnover;
- investments in equity;
- fixed assets value.

The resultant index of socio-economic development of the regional center and the region shall be the volume of shipped own-produced goods, in-house works and services (without small businesses).

In this regard, changes in indices shall be evaluated by the calculation of their average annual growth rates.

The second stage is characteristics of the start position of the agglomeration nucleus before formation thereof by the following indices:

- agglomeration type — determined by the number of agglomeration nuclei and characterizes its structural feature (monocentric or polycentric);

- the population density of the “nucleus”—characterized by the number of population inhabiting 1 km<sup>2</sup>;
- centralization level of the agglomeration “nucleus”—correlation of the population of the nucleus to the next populated town;
- national composition of the agglomeration’s “nucleus”.

The third stage is characteristics of the start position of the urban agglomeration by the following indices:

1. Crowd index—a number of population of the central city: medium (100–250 ths. people); big (250–500 ths. people); large (500–1000 ths. people); largest (over 1000 ths. people) [20];
2. An agglomerativeness coefficient—characterizes formation and development of the environment. Calculated as a density of the urban settlements network relegated to the average shortest distance between them:

$$C_a = \frac{N}{S} \times L, \quad (1)$$

where  $N$ —a number of urban settlements on the agglomeration’s territory;  $S$ —an area of the agglomeration’s territory, km<sup>2</sup>;  $L$ —shortest distance between the urban settlements [36, p. 47].

3. An agglomerativeness index—a correlation of the number of the urban population of the external area to the number of the urban population of the entire agglomeration:

$$I_a = \frac{P}{P_a}, \quad (2)$$

where  $P$ —a number of the urban population of the satellites’ area;  $P_a$ —a number of the urban population of the agglomeration [36, p. 47].

4. The index of the agglomeration’s population development:

$$C_{dev} = P(M \times m + N \times n), \quad (3)$$

where  $P$ —a number of population of the urban agglomeration (mln. people);  $M$ —a number of towns in the urban agglomeration;  $N$ —a number of urban settlements in the urban agglomeration;  $m$ —the share of the number of population of towns in the number of population of the urban agglomeration;  $n$ —the share of the number of population of urban settlements in the number population of the urban agglomeration [36, p. 47];

The development index ( $C_{dev}$ ) must exceed 1 to consider a system of settlements to be an agglomeration [36, p. 47].

Urban agglomeration development classes are outlined based on the development coefficient value:

- over 50—most developed;
- from 10 to 50—strongly developed;
- from 5 to 10—developed;
- from 2,5 to 5—weakly developed;
- less than 2,5—less developed;
- urban agglomerations, which do not match any of the criteria, are potential [39, P. 20].

5. Agglomeration development rates measured by the index of the urban populations’ average annual growth rates over 20 years. All urban agglomerations are divided into non-dynamic (urban populations’ average annual growth rates over 20 years are less than 1 %), weakly dynamic (1–2 %), medium dynamic (2–4 %), highly dynamic (4–5 %), specially dynamic (over 5 %) [40].

The fourth stage is the analysis of peculiar features of the agglomerations’ internal environment by the key characteristics:

- specificity of the geographic position and characteristics of field specialization;
- development of transport infrastructure;
- degree of homogeneity of the economic, social and environmental space.

## Results

The natural bent of the population of the nearest territories to Chelyabinsk has been forming for years, but juridically the Chelyabinsk urban agglomeration was established in June 2014. In included



residents of two cities (regional center and Kopeisk) and five municipal areas (Korkino, Krasnoarmeisk, Sosnovka, Yemanzhelinsk and Etkul) consisting of 213 urban and rural settlements. The area of the agglomeration comprises 9,5 ths. km<sup>2</sup> <sup>2</sup>. The number of the agglomeration's population comprises 1581,6 ths. people. <sup>3</sup>

The following objective conditions contributed to the appearance of the agglomeration:

1) geographical: territorial proximity of densely populated towns and settlements to the agglomeration nucleus;

2) stable social and economic links (social, trade and infrastructural contacts);

3) presence of push-pull migration manifested in mass business, educational and cultural trips of the population to the regional center.

The characteristics of appearance of the above conditions by individual spheres were outlined as a result of a social interrogation of the citizens of Chelyabinsk agglomeration, who noted that the mass trips to the regional center were typical of them for the following purposes:

— ability to implement your labor and to earn salary;

— purchases in the consumer market, as well as obtaining of services, especially in the health care sphere;

— organization of leisure, culture and sport [28, p. 133–138].

At the first stage, let us make a comparative characteristics of Chelyabinsk and the Chelyabinsk region by the key indices of socio-economic development in 2015 (Table 1).

Table 1

Indices of socioeconomic development of Chelyabinsk and Chelyabinsk region in 2015<sup>4</sup>

Index	Chelyabinsk	Chelyabinsk region	Correlation of the indices of Chelyabinsk to the indices of Chelyabinsk region
Volume of shipped goods per capita, mln rub.	0,48	0,42	1,14
Average monthly nominal accrued wage, rub.	32725,30	30686,90	1,07
Coefficient of migration gain per 1000 people (2014)	9,90	1,60	6,19
Agricultural products per 1000 people, mln. rub. (2014)	1,66	27,81	0,06
New housing supply per capita, m <sup>2</sup>	0,48	0,51	0,94
Retail turnover per capita, mln. rub.	0,09	0,06	1,50
Investments in equity per 1000 people bln. rub.	0,07	0,05	1,40
Fixed assets value per 1000 people, bln. rub. (2014)	0,04	0,05	0,80

According to the data from Table 1, Chelyabinsk outstrips socio-economic development of the region by several indices:

- volume of shipped goods per capita — in 1,14 times;
- average monthly nominal accrued wage — in 1,07 times;
- coefficient of migration gain — in 6,19 times;
- retail turnover per capita — in 1,5 times;
- investments in equity per 1000 people — in 1,4 times.

At the same time, Chelyabinsk lags behind regional development by the output of agricultural products per 1000 people — in 16,75 times, new housing supply per capita (m<sup>2</sup>) — in 1,06 times; fixed assets value per 1000 people — in 1,25 times.

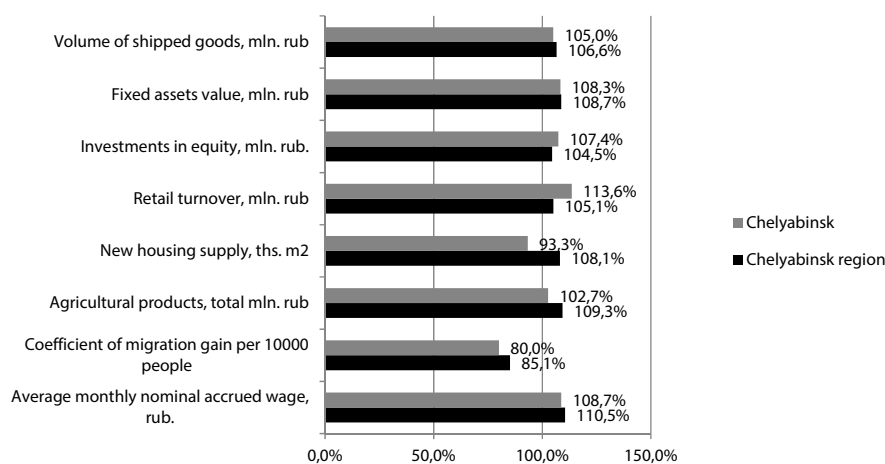
Let us analyze the dynamics of the indices of socio-economic development of the regional center and Chelyabinsk region based on the average annual growth rates (fig.).

The comparison of the average annual growth rates of socio-economic indices of Chelyabinsk and Chelyabinsk region allows to make the following conclusions.

<sup>2</sup> Retrieved from: [https://ru.wikipedia.org/wiki/Chelyabinsk\\_agglomeration](https://ru.wikipedia.org/wiki/Chelyabinsk_agglomeration) (date of access: 03.03.2016).

<sup>3</sup> Chelyabinskstat. Retrieved from: <http://chelstat.gks.ru> (date of access: 03.03.2016).

<sup>4</sup> Same.



**Fig.** Correlation of average annual growth rates of indices of Chelyabinsk and Chelyabinsk region over 2011–2015

Firstly, by the majority of indices, there is a positive dynamics of growth rates of the regional center and the region over 2011–2015 (except for new housing supply in Chelyabinsk and the coefficient of migration gain in the regional center and Chelyabinsk region in general).

Secondly, based on the analysis, it is clear that by the majority of indices the dynamics of average annual growth rates of the city and the region coincides. It concerns such indices as the volume of shipped goods and services (growth rates for Chelyabinsk—105,0 %, for the region—106,6 %), fixed assets value (108,3 and 108,7 % accordingly), investments in equity (107,4 and 104,5 % accordingly), coefficient of migration gain (80 and 85,1 % accordingly), average monthly nominal accrued wage (108,7 and 110,5 % accordingly). Such dynamics of the key socio-economic development indices witnesses of a balance and homogeneity of socio-economic development of the territory of Chelyabinsk region in general.

Thirdly, considerable deviations in the dynamics are registered only for three indices: retail turnover (for the regional center—113,6 %, for Chelyabinsk region—105,1 %), new housing supply (93,3 % and 108,1 % accordingly), as well as agricultural products (102,7 % and 109,3 % accordingly).

The second stage presents the start position of the agglomeration's nucleus (Chelyabinsk) before the formation of Chelyabinsk agglomeration (table 2).

Table 2

**Characteristics of the nucleus of Chelyabinsk urban agglomeration (Chelyabinsk) as of 01.01.2015<sup>5</sup>**

Criterion	Content
Agglomeration type (structural feature)	Monocentric
Geographical position of the agglomeration	Ural Federal District
Area of Chelyabinsk, km <sup>2</sup>	530
Population of Chelyabinsk, mln people	1,183 387
Density, people/km <sup>2</sup>	2232,81
Share of population of the nucleus (Chelyabinsk) in the regional structure, %	0,34
Level of centralization of the agglomeration's nucleus (correlation of the population of the nucleus to the next populated city)	8,19
National composition of the nucleus (Chelyabinsk) per 1000 people, who specified national affiliation	Russians (83,8 %), Tatars (5,4 %), Bashkirs (4,8 %), Ukrainians (1,5), Kazakhs (1 %), Germans (0,5 %), Byelorussians (0,4 %), Mordovians (0,4 %), Nagaibaks (0,2 %), other nationalities (2 %)

At the third stage, we analyzed the Chelyabinsk urban agglomeration in accordance with the agglomeration characteristics:

— value of the crowd index testifies that it refers to the largest agglomerations (over 1000 ths. people).

<sup>5</sup> Chelyabinskstat. Retrieved from: <http://chelstat.gks.ru> (date of access: 03.03.2016).

— agglomerativeness coefficient (formula 1) comprises:

$$C_a = \frac{N}{S} \times L = \frac{8 \text{urb.settlement}}{9,5 \text{ths.km}^2} \times 15 \text{km} = 0,013 \text{urb.settlement / km};$$

— agglomerativeness index reflecting the correlation of the urban population of the external area to the urban population of the entire agglomeration o (2):

$$I_a = \frac{P}{P_a} = \frac{1703305 \text{people}}{1183387 \text{people}} = 1,44;$$

— coefficient of population development of Chelyabinsk agglomeration (3) comprises:

$$C_{dev} = P(M \times m + N \times n) = 1,58(4 \times 0,88 + 4 \times 0,03) = 5,75.$$

Subject to the procedure of the Institute of Geography of RAS, Chelyabinsk agglomeration refers to developed agglomerations, whereas its coefficient is within the range of 5—10 [39, p. 20];

— agglomeration growth rates measured by the average annual growth rates of the urban population over 20 years comprise 0,35 %. Whereas, the index value is less than one; by the dynamic typology, Chelyabinsk refers to a non-dynamic urban agglomeration [40].

At the fourth stage, let us analyze the characteristics of the internal environment of the formed agglomeration.

*First.* The industry of most satellite towns (Kopeisk, Korkino, Yemanzhelinsk) and their villages appeared as a result of the opening of the lignite basin in the 1930s, whereas, according to the GOELRO plan, regional electric power plants has to use local fuel. The intensive development of natural resources, ignoring of environmental requirements led to the formation of a vast disrupted area (according to some estimates, with the width of 10 km and the length of about 65 km from north to south) [41], which landscape is laced with open cuts and mines, dumps and bogs with numerous intercalated mining towns and villages.

Over the last years, the profitability of lignite production considerably decreased, which led to a serious socio-economic tension resulting in a significant population migration to the regional center and extinction of peripheral villages in the urban structure. Thus, the characteristics of migration gain (loss) by urban districts and municipal areas (table 3) testify that over 2006–2014, the population growth increased only in the municipal formations, which are nearest to Chelyabinsk (Kopeisk—by 102,41 % and Sosnovka region—121,83 %). In Chelyabinsk, the population growth rates comprised 122,35 %. All other urban districts and municipal areas were characterized by migration loss of the population.

Table 3

Migration gain (loss) by urban districts and municipal areas (2006–2014)<sup>6</sup>

Urban district	2006	2007	2008	2009	2010	2011	2012	2013	2014	Growth rate, %
Chelyabinsk	2313	3560	2856	2600	4517	12169	11565	11602	11611	122,35
Kopeisk	527	602	585	–108	464	1063	1466	2243	2669	102,41
Korkino	–17	84	16	–75	–23	201	–360	–1020	–1193	89,96
Yemanzhelinsk	579	539	600	334	290	250	24	–424	–358	82,17
Krasnoarmeisk	238	492	557	343	360	643	569	–95	–945	88,27
Etkul	378	191	144	130	180	86	–58	60	–39	60,59
Sosnovka	257	220	829	1453	518	1103	698	882	1247	121,83

However, satellite towns are characterized by a developed transport infrastructure connecting them with each other and with the central city contributing to their actual merger, whereas, it creates favorable conditions for push-mull migration of the population: production, social, cultural, economic, etc.

*Second.* The social and economic space of the urban agglomeration is rather inhomogeneous, which is testified by the coefficient of the variation of the socio-economic development indices calculated for 2015 and expressed as a ratio of the maximum to the minimum value.

<sup>6</sup> Chelyabinskstat. Retrieved from: <http://chelstat.gks.ru> (date of access: 03.03.2016).



Thus, the territorial unevenness of economic development is characterized by the following:

- the volumes of investments in equity per capita distributed along the agglomeration's territory considerably differ: in Chelyabinsk—66,5 ths. rub., which is 12,3 times higher than the minimum value (Korkino municipal area); the same concerns investments in the equity of municipal organizations per capita (the coefficient of variation comprises 23, wherein maximum investments are registered in Sosnovka region);

- the program of new housing supply is implemented rather unevenly: maximum index of 4,1 m<sup>2</sup> per capita in Sosnovka region versus 0,1 m<sup>2</sup> in Yemanzhelinsk region (coefficient of variation = 41,0);

- maximum concentration of retail trade per capita in Chelyabinsk is 4,3 more than in Etkul municipal area.

There is a large spread in the values of social development indices along the agglomeration's territory:

- the average monthly nominal accrued wage in the Chelyabinsk urban district is maximum and 1,6 times outstrips the minimum wage (Krasnoarmeisk municipal area);

- the total average area of residential premises per capita is maximum in the Sosnovka region (37,3 m<sup>2</sup>) and exceeds the minimum value of this index in 1,8 times (Etkul municipal area).

And finally, the environmental condition of the agglomeration is rather problematic: the maximum volume of pollutant emissions into the atmosphere per capita discharged by stationary sources is registered in the Chelyabinsk municipal district, in 2014 it exceeded the volumes of emissions in Krasnoarmeisk region with the best environmental situation in 17,8 times, and in 2015 — in 19,2 times.

However, it should be noted that current expenses on environmental protection and payment of environmental services per capita demonstrate rather considerable changes in the coefficient of variation: in 2014, the ratio of the maximum value of this index (Chelyabinsk municipal district) to the minimum value (Krasnoarmeisk region) comprised 562,1 times, but in 2015, this index reached 64,9 times. It testifies that there is a slight leveling of allotment of funds for environmental protection, and, consequently, that there is a certain environmental policy on the territory of Chelyabinsk agglomeration.

### **Basic Conclusions**

The conducted analysis witnesses the presence of a rather contradictory situation: on the one hand, there is a relatively homogeneous socio-economic space of Chelyabinsk region with the socio-economic space of Chelyabinsk, which fits therein rather evenly. Alongside with that, the internal environment of the formed Chelyabinsk agglomeration is inhomogeneous from the economic, social and environmental perspectives.

We believe that the establishment of Chelyabinsk urban agglomeration will contribute to the adjustment of such difference and, in the long run, remove barriers and restrictions on the way of social, economic and environmental development:

1. Strengthening of the territorial differentiation of labor based on diversification of economics and accounting for the specificity of allocation of production forces of satellite towns, as a result of which core administrative, production and cultural functions will be concentrated in Chelyabinsk and non-core functions will be transferred to municipal areas [42].

2. Acting as a market customer of the innovative cluster by the means of a unified system of territorial planning based on the synchronization of site plans and "points of growth" of different municipal formations [28].

3. Exercising of efficient and complex land use by the reservation of optimal plots for housing construction, industrial and agricultural output in view of the available infrastructure.

4. The increasing of the infrastructural prosperity of Chelyabinsk urban agglomeration due to economies of the scale of production [43].

5. Continuation of the complex development of housing and public utilities towards formation of a waste disposal system due to the economies of its costs (selection of optimal places for disposal sites, implementation of an efficient transport system, building of advanced rubbish recycling plants, etc.).

In conditions of the global economic crisis, the development of Chelyabinsk agglomeration will allow to activate the solution of problems connected with the provision of a stable inflow of investments and competitive recovery of the regional economy; the agglomeration will enter the global market as the main entity in the system of trade, financial and technological exchange; development of

technical and social infrastructure; increase in resistance of the region in general to perturbations of the economic environment at meso and macro levels.

Alongside with that, the phenomenon of Russian agglomeration, in general, and the Ural agglomeration, in particular, lies in the fact that concentration of the economic, financial and service functions in urban agglomerations passes on the background of degradation of, primarily, small towns (especially company towns) and peripheral towns beyond the agglomerations [25]. It results in:

— depopulation of adjacent territories and appearance of certain disbalances (demographic, production, etc.);

— loss of control over considerable land plots [23, p. 35].

Therefore, many-sided and complex agglomeration processes in conditions of such a large country as the Russian Federation must objectively become one of the elements of the national regional policy, which provides for the elimination of administrative barriers and development of the institutional environment in the form of a proper regulatory support.

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